

CLAIMS

1. An operating mechanism for a movable closure element to
releasably engage a strike assembly on a frame support and thereby releasably
maintain a movable closure element on which the operating mechanism is
mounted in a predetermined position relative to the frame support, the
operating mechanism comprising:

a base comprising an elongate portion with a first axis and a wall
extending around the first axis and defining a passageway;

a latch system on the base and having (a) a latched state in which
the latch system engages a strike element on the strike assembly so as to
maintain a movable closure element on which the operating mechanism is
mounted in the predetermined position and (b) a released state wherein the
latch system can be disengaged from a strike element so as to allow a
movable closure element on which the operating mechanism is mounted to be
moved from the predetermined position; and

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an actuating system on the base and changeable from a first state
16 into a second state to thereby change the latch system from the latched state
into the released state,

18 the actuating system comprising at least a first link which is
movable axially within the passage from a first position into a second position
20 to thereby change the latch system from the latched state into the released
state,

22 the actuating system further comprising an actuating assembly
for the at least first link that can be directed radially through the wall on the
24 base into operative engagement with the base without requiring separate
fasteners to maintain the operative engagement between the actuating
26 assembly and the base.

2. The operating mechanism for a movable closure element
2 according to claim 1 wherein the actuating system comprises a second link
that can be operatively engaged with the at least first link without requiring
4 separate fasteners.

3. The operating mechanism for a movable closure element
2 according to claim 2 wherein the second link has a receptacle for supporting
a part of the at least first link for pivoting movement about a second axis that
4 is transverse to the first axis.

4. The operating mechanism for a movable closure element
2 according to claim 3 wherein the second link has a slot communicating with
the receptacle and extending radially relative to the second axis from the
4 receptacle.

5. The operating mechanism for a movable closure element
2 according to claim 4 wherein the actuating assembly comprises an actuating
element that is repositionable relative to the base between a normal position
4 and an actuated position, and the second link is connected to the actuating
element.

6. The operating mechanism for a movable closure element
2 according to claim 5 wherein the second link is connected to the actuating
element for relative pivoting movement around a third axis.

7. The operating mechanism for a movable closure element
2 according to claim 6 wherein the third axis is substantially parallel to the
second axis.

8. The operating mechanism for a movable closure element
2 according to claim 6 wherein the actuating element is movable relative to the
base around a fourth axis.

9. The operating mechanism for a movable closure element
2 according to claim 6 wherein the slot extends radially along a line relative to
the second axis from the second axis, the second link is movable relative to
4 the base around a fourth axis between first and second orientations, the
second link is in the first orientation with the actuating element in the normal
6 position and in the second orientation with the actuating element in the

actuated position, and with the second link in and between the first and
8 second orientations, a line of a force acting between the second link and the
part of the at least first link is non-parallel to the line of the slot.

10. The operating mechanism for a movable closure element
2 according to claim 9 wherein the second link has an end that slides axially
relative to the first axis guidingly along the wall as the actuating element is
4 repositioned between the normal and actuated positions.

11. The operating mechanism for a movable closure element
2 according to claim 10 wherein the wall has a first opening bounded by an edge
with a thickness, the actuating system further comprises a frame with first and
4 second oppositely facing surfaces, the actuating element is mounted for
pivoting movement relative to the frame around the fourth axis, and at least
6 a part of the frame is deformable so that as the frame is pressed into the wall,
the at least part of the frame changes from an undeformed state into a
8 deformed state to allow the first surface on the frame to move past the edge
and thereafter reassume the undeformed state so that the edge of the wall is

10 captive between the first and second surfaces whereupon the actuating
assembly is in the operative engagement with the base.

2 12. The operating mechanism for a movable closure element
according to claim 11 wherein the first and second surfaces are spaced by a
distance that is approximately the same as the thickness of the edge.

2 13. The operating mechanism for a movable closure element
according to claim 11 wherein the second surface extends substantially fully
around the wall opening and bears against a surface on the base that faces
4 radially outwardly relative to the first axis.

2 14. The operating mechanism for a movable closure element
according to claim 9 wherein the part of the at least first link has a diameter,
the slot has a width, and the slot width is less than the diameter of the part
4 of the at least first link.

15. The operating mechanism for a movable closure element
2 according to claim 11 wherein the wall has an annular, outwardly facing
surface and there is no opening in the outwardly facing surface diametrically
4 opposite to the first opening.

16. The operating mechanism for a movable closure element
2 according to claim 9 wherein the actuating system comprises a frame to which
the actuating element is mounted for pivoting movement around the fourth
4 axis and the housing is reversibly mountable in first and second different
positions relative to the base so that the actuating element pivots in opposite
6 directions around the fourth axis as the actuating element is repositioned from
the normal position into the actuated position with the housing in the first and
8 second different positions.

17. The operating mechanism for a movable closure element
2 according to claim 15 wherein the actuating system further comprises a spring
acting between the actuating element and the second link for normally urging
4 the second link towards the first orientation.

18. The operating mechanism for a movable closure element
2 according to claim 1 wherein the base comprises a tubular element that
defines the elongate portion and first and second supports for the tubular
4 element that are spaced axially relative to the first axis.

19. The operating mechanism for a movable closure element
2 according to claim 18 wherein the tubular element is releasably connectable
to each of the first and second supports to allow selective connection of
4 tubular elements of different configuration to the first and second supports.

20. The operating mechanism for a movable closure element
2 according to claim 18 wherein the tubular element can be selectively
connected to the first support in first and second different, predetermined
4 angular orientations.

21. The operating mechanism for a movable closure element
2 according to claim 20 wherein the tubular element is releasably connectable

4 to the first support without requiring any separate fasteners and with the
tubular element connected to the first support and the first and second
6 supports mounted to a closure element, the tubular element and first support
cannot be separated from each other.

22. The operating mechanism for a movable closure element
2 according to claim 3 wherein the second link exerts a tensile force on the at
least first link as the at least first link is moved from the first position into the
4 second position.

23. The operating mechanism for a movable closure element
2 according to claim 3 wherein the second link exerts a compressive force on the
at least first link as the at least first link is moved from the first position into
4 the second position. —

24. The operating mechanism for a movable closure element
2 according to claim 3 wherein the at least first link has an elongate portion with
a free end and the part of the at least first link is spaced from the free end.

25. The operating mechanism for a movable closure element
2 according to claim 24 wherein the elongate portion has a substantially straight
section extending along a first line substantially parallel to the first axis and the
4 part of the at least first link extends transversely to the first line along a
second line.

26. The operating mechanism for a movable closure element
2 according to claim 25 wherein the at least first link has a free end section
which projects a) along a third line that is transverse to the second line and b)
4 to the free end of the elongate portion.

27. The operating mechanism for a movable closure element
2 according to claim 26 wherein the first and third lines are substantially parallel
to each other.

28. The operating mechanism for a movable closure element
2 according to claim 26 wherein the elongate portion of the at least first link is

4 connected to the second link by directing the elongate portion of the at least
first link through the receptacle by relatively reorienting the at least first link
and second link, while relatively moving the elongate portion of the at least
6 first link and second link along the first and second lines as the elongate
portion of the at least first link is directed through the receptacle.

29. The operating mechanism for a movable closure element
2 according to claim 1 in combination with a movable closure element to which
the operating mechanism is attached.

30. The operating mechanism for a movable closure element
2 according to claim 29 further in combination with a frame support having a
strike assembly, the movable element mounted for movement between the
4 predetermined position and a second position, with the latch system engaging
the strike assembly with the movable element in the predetermined position.

31. The operating mechanism for a movable closure element
2 according to claim 1 wherein the wall has an opening bounded by an edge and

the frame comprises a wall and a transverse flange that cover the edge so that
4 the edge is not exposed to a user of the operating mechanism.

32. The operating mechanism for a movable closure element
2 according to claim 11 wherein the base comprises a first tubular element with
an outside surface having a first diameter through which the first opening is
4 formed and further in combination with a second tubular element having an
outside surface through which a second opening corresponding to the first
6 opening is formed, the second tubular element having a second diameter that
is different than the first diameter, and the frame can be selectively pressed
8 into the first and second openings to place the actuating assembly into
operative engagement with the base.

33. The operating mechanism for a movable closure element
2 according to claim 32 wherein the second link has first configuration and
further in combination with an interchangeable link having a configuration that
4 is different than that of the second link and that is useable in place of the

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second link with the actuating assembly in operative engagement with the
base using the second tubular element.

34. An operating mechanism for a movable closure element to
releasably engage a strike assembly on a frame support and thereby releasably
maintain a movable closure element on which the operating mechanism is
mounted in a predetermined position relative to the frame support, the
operating mechanism comprising:

a base comprising an elongate portion with a first axis and a wall
extending around the first axis and defining a passageway;

a latch system on the base and having (a) a latched state in which
the latch system engages a strike element on the strike assembly so as to
maintain a movable closure element on which the operating mechanism is
mounted in the predetermined position and (b) a released state wherein the
latch system can be disengaged from a strike element so as to allow a
movable closure element on which the operating mechanism is mounted to be
moved from the predetermined position; and

an actuating system on the base and changeable from a first state
16 into a second state to thereby change the latch system from the latched state
into the released state,

18 the actuating system comprising at least a first link which is
movable axially within the passage from a first position into a second position
20 to thereby change the latch system from the latched state into the released
state,

22 the actuating system further comprising an actuating assembly
for the at least first link and comprising a second link that can be operatively
24 connected to the at least first link without requiring separate fasteners.

35. The operating mechanism for a movable closure element
2 according to claim 34 wherein the second link has a receptacle for supporting
a part of the at least first link for pivoting movement about a second axis that
4 is transverse to the first axis.

36. The operating mechanism for a movable closure element
2 according to claim 35 wherein the second link has a slot communicating with

the receptacle and extending radially relative to the second axis from the
4 receptacle.

37. The operating mechanism for a movable closure element
2 according to claim 35 wherein the actuating assembly comprises an actuating
element that is repositionable relative to the base between a normal position
4 and an actuated position, and the second link is connected to the actuating
element.

38. The operating mechanism for a movable closure element
2 according to claim 37 wherein the second link is connected to the actuating
element for relative pivoting movement around a third axis.

39. The operating mechanism for a movable closure element
2 according to claim 38 wherein the third axis is substantially parallel to the
second axis.

2 40. The operating mechanism for a movable closure element
according to claim 38 wherein the actuating element is movable relative to the
base around a fourth axis.

2 41. The operating mechanism for a movable closure element
according to claim 40 wherein the second link has an end that slides axially
relative to the first axis guidingly along the wall as the actuating element is
4 repositioned between the normal and actuated positions.

2 42. The operating mechanism for a movable closure element
according to claim 41 wherein the second link is movable selectively reversibly
mountable for movement in opposite directions around the fourth axis as the
4 actuating element is changed from the normal position into the release
position.

2 43. The operating mechanism for a movable closure element
according to claim 41 wherein the actuating system further comprises a spring

4 acting between the actuating element and the second link for normally urging
the second link in movement around the third axis.

2 44. The operating mechanism for a movable closure element
according to claim 41 wherein the second link exerts a tensile force on the at
least first link as the at least first link is moved from the first position into the
4 second position.

2 45. The operating mechanism for a movable closure element
according to claim 41 wherein the second link exerts a compressive force on
the at least first link as the at least first link is moved from the first position
4 into the second position.

2 46. The operating mechanism for a movable closure element
according to claim 34 wherein the at least first link has an elongate portion
with a free end and the part of the at least first link is spaced from the free
4 end.

47. The operating mechanism for a movable closure element
2 according to claim 46 wherein the elongate portion has a substantially straight
section extending along a first line substantially parallel to the first axis and the
4 part of the at least first link extends transversely to the first line along a
second line.

48. The operating mechanism for a movable closure element
2 according to claim 47 wherein the at least first link has a free end section
which projects a) along a third line that is transverse to the second line and b)
4 to the free end of the elongate portion.

49. The operating mechanism for a movable closure element
2 according to claim 48 wherein the first and third lines are substantially parallel
to each other.

2 50. The operating mechanism for a movable closure element
according to claim 48 wherein the elongate portion of the at least first link is
connected to the second link by directing the elongate portion of the at least
4 first link through the receptacle by relatively reorienting the at least first link
and second link, while relatively moving the elongate portion of the at least
6 first link and second link along the first and second lines as the elongate
portion of the at least first link is directed through the receptacle.

2 51. The operating mechanism for a movable closure element
according to claim 34 in combination with a movable closure element to which
the operating mechanism is attached.

2 52. The operating mechanism for a movable closure element
according to claim 51 further in combination with a frame support having a
strike assembly, the movable closure element mounted for movement between
4 the predetermined position and a second position, with the latch system
engaging the strike assembly with the movable element in the predetermined
6 position.